

Formation of transition metal oxide nanoparticles in an ordered nanoporous silica channels

한석환, 장정호*, 김경자
한국요업(세라믹) 기술원
(jhchang@kicet.re.kr*)

This work presented the formation of transition metal oxide nanoparticles in a hexagonally ordered nanoporous silica channels. After impregnation of metal cations in aqueous solution, the nanoporous silica mixture was dried and calcined at the different temperature. The characterization of nanoparticles formation was performed by TEM, SEM, and XRD including a small angle XRD. The size of formed nanoparticles showed the dependency on the channel size. The obtained transition metal oxide nanoparticle contained nanoporous silica was treated with hydrofluoric acid to remove the silica templates. Consequently, the transition metal oxide nanoparticles were obtained, and characterized by TEM, BET, Zeta-potential measurement to confirm. To elucidate the interaction between metal cation and nanoporous silicas, solid-state ^{29}Si , ^{13}C -MAS NMR, and XPS were used. The porous characteristics was evaluated by nitrogen adsorbed BET, and morphology of mesoporous particle was characterized by TEM and FE-SEM.